

**CLASS XI**

**BIOLOGY**

**Unit-5 (Humans Physiology)**

**Digestion and Absorption**

1. The food mixes thoroughly with the acidic gastric juice of the stomach by the churning movements of its muscular wall. What we call the food then?
2. Trypsinogen is an inactive enzyme of pancreatic juice. An enzyme, enterokinase activates it, which tissue/cell secrete this enzyme? How is it activated?
3. Does gall bladder make bile?
4. Name the enzymes involved in breakdown of nucleotides into sugar and bases?
5. Define digestion in one sentence?
6. What do we call the type of teeth attachment to jaw bones in which each tooth is embedded in a socket of jaw bones?
7. What are three major type of cells found in gastric glands? Name their secretions?
8. How is intestinal mucosa protected from the acidic food entering from stomach? **(HOTS)**
9. How are the activities of GI tract regulated?
10. Distinguish between constipation and indigestion. Mention their major causes.
11. Describe the enzymatic action on fats in the duodenum.
12. What is Pancreas? Mention the major secretion of pancreas those are helpful in digestion?
13. A patient is advised to take more of yellow fruits, carrots & butter in his food. Which deficiency disease is he suffering from? **(HOTS)**
14. What is the role of gall bladder? What may happen if it stops functioning or is removed?
15. A person had roti and dal for its lunch. Trace the changes in those during its passage through the alimentary canal. **(HOTS)**
16. Discuss mechanism of absorption.
17. Discuss the role of hepato-pancreatic complex in digestion of carbohydrate, protein and fat components of food.
18. Explain the process of digestion in the buccal cavity with a note on arrangement of teeth.

### **Breathing & Exchange of Gases.**

1. A fluid filled double membranous layer surrounds the lungs. Name it & mention its function.
2. Name the primary site for gaseous exchange in our body.
3. 'Cigarette smoking causes Emphysema'. Comment.
4. State the different modes of Carbon dioxide transport in blood.
5. Differentiate between the following:
  - (a) Inspiratory & Expiratory Reserve Volume
  - (b) Vital Capacity & Total Lung Capacity
  - (c) Occupational Lung Disorder & Emphysema
6. Why vigorous exercise sometimes result in muscular pain?
7. What is partial pressure? How does it help in gaseous exchange during respiration?
8. What is chloride shift? Write its significance during respiration.
9. "Respiration in insects is called direct respiration". Why?
10. How does respiration fulfill the energy requirements of an organism?
11. Under certain conditions the oxygen-Hemoglobin dissociation curve will show a right shift. Explain those conditions in detail.
12. Draw a flow chart to show transportation of oxygen & carbon dioxide between alveoli & tissue.
13. Name the important parts involved in creating a pressure gradient between lungs & atmosphere during normal respiration.
14. Why is expiration called passive process? **(HOTS)**
15. All land animals are air breathers. How does respiratory system in insects differ from respiratory organs of vertebrates? **(HOTS)**
16. Give reason: 'Breathing 100 % oxygen from oxygen gas tank cannot significantly increase the amount of oxygen obtained in the RBCs'. **(HOTS)**
17. Contraction of Inspiratory muscles is essential for inspiration but expiration takes place by their relaxation? **(HOTS)**
18. Why is nasal breathing better than mouth breathing? **(HOTS)**

## Body Fluids & Circulation

1. What is blood? Enlist its various components along with their functions.
2. Name the vascular connection that exists between the digestive tract & Liver.
3. Define the following terms & give their location.
  - (a) Purkinje fibres
  - (b) Bundle of His
4. Draw a well labelled diagram of Human heart.
5. Explain the consequences of a situation in which blood does not coagulate?
6. What physiological circumstances lead to 'erythroblastosis foetalis'?
7. Write the features that distinguish between the two –
  - (a) Plasma & Serum
  - (b) Open & Closed circulatory system
  - (c) SAN & AVN
  - (d) Mixed & Double circulation
  - (e) Monocytes & Lymphocytes
8. Explain Rh incompatibility in Humans.
9. Describe the events of cardiac cycle in detail.
10. How will you interpret an Electrocardiogram (ECG) time taken in QRS complex is higher?
11. Which coronary artery disease is caused due to narrowing of lumen of arteries?
12. What are Heart Sounds? Explain them briefly.
13. What is homeostasis?
14. What is a tissue fluid & how is it formed? **(HOTS)**
15. In which phylum is circulatory system closest to vertebrate circulatory system & how?
16. Simple organisms such as cnidarians & platyhelminthes lack specialized circulatory system for the distribution of material. How are they able to obtain nutrients & oxygen? **(HOTS)**
17. What factors speeds up erythropoiesis? **(HOTS)**
18. Why is carbon monoxide lethal? **(HOTS)**
19. What are three functions of spleen?

## Excretory Products & their Elimination

1. Where does the selective reabsorption of glomerular filtrate take place?
2. What is excretory product from kidney of reptiles?
3. Name the excretory structure found in Amoeba.
4. What is the composition of sweat produced by sweat glands? Give role of sebaceous glands present in the body.
5. Mention two metabolic disorders, which can be diagnosed by analysis of urine.
6. What is the role played by rennin-angiotensin in the regulation of kidney function?
7. Aquatic animals are generally ammonotelic in nature whereas terrestrial forms are not. Comment.
8. Complete the following sentences:-
  - (a) Urinary excretion = tubular secretion + tubular reabsorption - ?
  - (b) Dialysis fluid = Plasma - ?
9. Explain, why is a haemodialysing unit called as 'artificial kidney'?
10. Comment upon the hormonal regulation of selective reabsorption.
11. Draw a labelled diagram showing reabsorption & secretion of major substances in different parts of nephron.
12. The composition of urine and nephric filtrate is not same. Comment.
13. Sort out the following into actively or passively transported substances during reabsorption of GFR e.g. (Glucose, amino acids,  $\text{Na}^+$ , nitrogenous waste, water)
14. What is the procedure advised for the correction of extreme renal failure?
15. The filtrate in the loop of Henle gets concentrated in the descending and then get diluted in ascending limb. Explain.
16. How does tubular secretion help in maintaining ionic & acid-base balance in the body fluids?
17. Explain the detailed internal structure of human kidney.
18. Write short on Micturition and disorders of excretory system.
19. Though urine is formed from alkaline blood, how does it become acidic? Explain.
20. Why does urine not flow backwards into the ureter when the urinary bladder contracts?
21. Why are patients of kidney disorders advised to consume less protein?
22. Only nitrogenous substances like urea and uric acid diffuse out from the blood into the dialyzing fluid in an artificial kidney, but not NaCl. Give reason.
23. How is Osmoregulation achieved in sharks, reptiles, birds & desert mammals? **(HOTS)**
24. Why has ureotelism evolved to replace ammonotelism? **(HOTS)**
25. In which vertebrate, uriniferous tubules are without Bowman's capsule? How does excretion occur in them? **(HOTS)**
26. Why are efferent renal arterioles narrower than afferent renal arterioles? **(HOTS)**

## Locomotion & Movement

1. With respect to rib cage, explain the following:-
  - (a) Bicephalic ribs
  - (b) True ribs
  - (c) Floating ribs
2. In old age people often suffer from stiff & inflamed joints. What is this condition called? What are the possible reasons for these symptoms?
3. Exchange of calcium between bone & ECF takes place under influence of certain hormones.
  - (a) What will happen if more of  $\text{Ca}^{+2}$  are in ECF?
  - (b) What will happen if very less amount of  $\text{Ca}^{+2}$  are in ECF?
4. Rahul exercises daily by visiting a gym, irrespective of that he is gaining weight. What could be the possible reasons for this? **(HOTS)**
5. What is the source of energy for muscle contraction?
6. Calcium ions concentration in blood affects muscle contraction. Does it lead to tetany in certain cases? How will you correlate fluctuations in blood calcium and tetany?
7. How does our bone joints function without grinding noise & pain? **(HOTS)**
8. Sarcolemma, sarcoplasm & sarcoplasmic reticulum refer to a particular type of cell in our body. Which is this cell & what parts of the cell these name refer to?
9. Radha was running on a treadmill at a great speed for 15 min. continuously. She stopped the Treadmill & abruptly came out. For the next few minutes, she was breathing heavily/fast. Answer the following questions. **(VBQ)**
  - (a) What happened to her muscles when she did strenuously exercise?
  - (b) How did her breathing rate changed?
10. Our forearm is made up of three bones. Comment.
11. Which tissue is affected in Myasthenia gravis? What is the underlying cause?
12. Differentiate between the following:-
  - (a) Pelvic & Pectoral Girdle
  - (b) Actin & Myosin
  - (c) Cartilaginous & Fibrous joints
13. The three bones present in middle ear are called ear ossicles. Write them in correct sequence beginning from ear drum.
14. Draw a well labelled diagram of actin filament & label its different parts.
15. What is the point for articulation of pelvic & pectoral girdle?
16. Name at least two hormones which result in fluctuation of  $\text{Ca}^{+2}$  level.
17. Why does a red muscle fibre can work for prolonged period untired while a white muscle fibre gets fatigued after a short work? **(HOTS)**
18. Give importance of Cori's cycle. **(HOTS)**
19. What are the differences between male pelvis & female pelvis?
20. How does neuromuscular junction differ from synapse? **(HOTS)**
21. Why Atlas vertebra is called 'Yes bone'? **(HOTS)**
22. Which group of animals has tube feet?
23. What makes synovial joints freely movable?

## Neural Control & Coordination

1. Why does the ear have pinna? **(HOTS)**
2. What is the function of Nissl's granule in cyton? **(HOTS)**
3. Where are ceruminous glands found? What is their function?
4. What is saltatory conduction occur? Where does it occur? Give its significance.
5. Name the membrane that forms the roof & floor of the scala media.
6. Why cerebral cortex is highly folded? **(HOTS)**
7. What is dark adaptation with reference to seeing in dark?
8. What cause colour blindness? Which type of colour blindness is the most common in human beings?
9. Which photosensitive cells do give us coloured vision?
10. Give reason why is blind spot insensitive to light, though it is a part of retina responsible for most distinct vision & why? **(HOTS)**
11. What is function of pinna? Why is pinna large & movable in cattle, dogs, rabbits etc.
12. Describe how each of the following is achieved in mammal:
  - (a) Control of the light entering the eye
  - (b) Focusing on a distant object
  - (c) Colour perception
13. Give reason :- **(HOTS)**
  - (a) Whether the mammalian heart will continue beating or not if neural connection of heart is severed?
  - (b) What will happen if sympathetic control to the heart is re-established in such case?
  - (c) What will happen if parasympathetic control to the heart is re-established?
14. What is the difference between electrical transmission & chemical transmission?
15. If someone receives blow on the back of neck, what would be the effect on the person's CNS?
16. While travelling at a higher altitude, a person complains of dizziness & vomiting sensation. Which part of the inner ear is disturbed during the journey?
17. Our reaction like aggressive behavior, use of abusive words restlessness etc. are regulated by brain, name the parts involved.
18. What are the characteristics of conditioned reflex?
19. (a) Name the chemical neurotransmitter.
  - (b) Where does it become functional?
  - (c) What is its function?
  - (d) Which neurotransmitter does inhibit neurotransmission? **(HOTS)**
20. Name the membranes that form roof & floor of scala media?
21. What is the difference between the arrangement of grey matter & white matter in the brain & spinal cord?

## Chemical Control & Integration

1. There are many endocrine glands in human body. Name the glands which is absent in male & the one absent in female.
2. What is erythropoiesis? Which hormones stimulate it?
3. Name the only hormone secreted by pars intermedia of the pituitary gland?
4. What is the role of second messenger in the mechanism of protein hormone action?
5. Correct the following statement by replacing the term underlined
  - (a) Insulin is a steroid hormone.
  - (b) TSH is secreted from Corpus luteum.
  - (c) The pineal gland is located on the anterior part of kidney.
  - (d) Tetraiodothyronine is an emergency hormone.
6. Calcium plays a very important role in the formation of bones. Write on the role of endocrine glands & hormones responsible for maintaining calcium homeostasis?
7. A milkman is very upset one morning as his cow refuses to give any milk. The milkman's wife gets the calf from the shed. On feeding by the calf, the cow gave sufficient milk. Describe the role of endocrine glands & pathway associated with this response?
8. Illustrate the difference between the mechanism of action of a protein & a steroid hormone.
9. A sample of urine was diagnose to contain high content of glucose. Based on this observation, answer the following :- (**HOTS**)
  - (a) Which endocrine gland & hormone is related to this condition?
  - (b) Name the cells on which this hormone acts.
  - (c) What is the condition called & how can it be rectified?
10. A patient complains about excessive thirst, excessive passing of urine & low blood pressure. When the doctor checked the patient's blood glucose & blood insulin level, the level were slightly low. The doctor diagnosed this condition as diabetes insipidus. But he decided to measure one or more hormone patient's blood. Which hormone does the Doctor intend to measure? (**HOTS**)
11. Name the hormone that helps in cell mediated immunity?
12. State whether true or false
  - (a) Gastrointestinal tract, kidney & heart also produces hormones.
  - (b) Pars distalis produces 6 trophic hormones.
  - (c) Insulin resistance results in a disease called as diabetes mellitus.
13. Name the endocrine glands that produce calcitonin & mention the role played by the hormone.
14. Which of the two adrenocortical layers, zona glomerulosa & zona reticularis lay outside enveloping the other?
15. Neurohormones secreted by hypothalamus are called either releasing factors or inhibiting factors. Why?

## Unit 1 (Diversity in Living World)

### The Living World

1. Linnaneus is considered Father of Taxonomy. Name two other botanists known for their contribution to the field of taxonomy.
2. What does ICZN stands for?
3. What is monograph?
4. A ball of snow when rolled over snow increases in mass, volume & size. Is this comparable to growth as seen in living organisms? Why?
5. A plant species shows several morphological variations in response to altitude gradient when grown under several conditions of growth, the morphological variants have common morphology. What are these variant called?
6. What is the difference between flora, fauna & vegetation? *Eichornia crassipes* is called as an exotic species. While *Rauwolfia serpentine* is an endemic species in India. What do these term exotic & endemic refer to? **(HOTS)**
7. A plant may have different names in different regions or country of world. How do botanists solve this problem?
8. Brinjal & potato belong to the same genus *Solanum*, but to two different species. What defines them as a separate species? **(HOTS)**
9. The number & kind of organisms is not same (constant). How do you explain this statement?
10. Couplet in taxonomy means.....?
11. What are taxonomical aids? Give the importance of herbaria & museum. How are Botanical gardens & Zoological parks useful in conserving biodiversity? **(HOTS)**
12. Do you consider a person in coma, living or dead?
13. A student of taxonomy was puzzled when told by his professor to look for a key to identify a plant. He went to his friend to clarify what `key` the professor was referring to? What would the friend explain to him? **(HOTS)**
14. What is the similarity between `whole moong dal` & `broken moong dal` in terms of respiration & growth? Based on these parameters classify them into living & non-living.
15. Some of the properties of tissues are not the constituents of its cells. Give three examples to support this statement. **(HOTS)**

### Biological Classification

1. What is the principle underlying the use of cyanobacteria in agricultural fields for crop improvements?
2. How is the five kingdom classification advantageous over two kingdom classification?
3. Polluted water bodies have usually high abundance of plants like *Nostoc* & *Oscillatoria*. Give reason. **(HOTS)**
4. Diatoms are called 'Pearls of Oceans', why? What is diatomaceous earth?
5. *Neurospora* an ascomycetes fungus has been used as biological tool to understand the mechanism of plant genetics much in the same way as *Drosophila* has been used to study animal genetics. What makes *Neurospora* so important as a genetic tool?
6. 'Peat' is an important source of domestic fuel in several countries. How is 'peat' formed in nature?
7. Make a list of algae & fungi that have commercial value as a source of food, chemicals, medicines & fodder.
8. Algae are known to reproduce sexually by variety of spores under different environmental conditions. Name these spores & the conditions under which they are produced?
9. What observable feature in *Trypanosoma* would make you classify it under kingdom Protista?
10. Fungi are cosmopolitan, write the role of fungi in your daily life.
11. Biological classification is a dynamic & ever evolving phenomenon which keeps changing with our understanding of life forms. Justify the statement taking any two examples. Discuss the change made in studying biological classification from time to time & also enumerate the needs for its change.
12. A Virus is considered as a living organism & an obligate parasite when inside a host. But Virus is not classified along with bacteria or fungi. What are the characters of Virus that are similar non living objects?
13. There is a myth that immediately after heavy rains in forest, mushrooms appear in large no. & make a very large ring of circle, which may be several meters in diameter. These are called as 'fairy rings'. Can you explain this myth of fairy rings in biological terms? **(HOTS)**
14. The common name of pea is simpler than its botanical (scientific) name *Pisum sativum* why then is the simpler common name not used instead of complex scientific/botanical name?
15. Are chemosynthetic bacteria autotrophic or heterotrophic?
16. Amoebic dysentery results in repeated motions with mucus & blood. Give reason. **(HOTS)**
17. Why are lichens so sensitive to air pollution? **(HOTS)**
18. Which group of the Monera are known as 'jokers of the plant kingdom' & why? **(HOTS)**
19. Cows & buffaloes release methane gas & pollute the environment adding to green house effect. Give reason.

## Plant Kingdom

- Most algal genera show haplontic life style. Name an alga which is:-
  - Haplo-diplontic
  - Diplontic
- Name the male & female sex organs of bryophytes.
- Why are bryophytes called as amphibians of the plant kingdom?
- How far does *Selaginella* one of the few living members of Lycopodiales (pteridophytes)?
- Each plant or group of plants has some phylogenetic significance in relation to evolution  
*Cycas*, one of the few living members of gymnosperms is called as the 'relic of past'. Can you establish a phylogenetic relationship of *Cycas* with any other group that justifies above statement? **(HOTS)**
- Heterospory i.e. formation of two kinds of spores- microspores & megaspores is a characteristic feature in the life cycle of than few members of pteridophytes & all spermatophytes. Do you think heterospory has some evolutionary significance?
- How are the male & female gametophytes of pteridophytes & gymnosperms different from each other?
- In which plant will you look for mycorrhiza & coralloid root? Also explain what these term mean?
- Comment on the life cycle and nature of a fern prothallus
- Lichen is usually cited as an example of 'symbiosis' in plants where an algal & fungal species live together for their mutual benefits. Which of the following will happen if algal & fungal partners are separated from each other? **(HOTS)**
  - Both will survive and grow normally & independent from each other.
  - Both will die.
  - Algal component will survive while the fungal component will die.
  - Fungal component ill survive while algal partner will die.Based on your answer how do you justify this association as symbiosis?
- Draw a labelled diagram of
  - Female & Male thallus of a liverwort
  - Gametophyte & Sporophyte of *Funaria*.
  - Alternation of generation in angiosperm.
- Explain why sexual reproduction in angiosperm is said to take place through double fertilization & triple fusion. Also draw a labelled diagram of embryo-sac to explain the phenomenon. **(HOTS)**

### Animal Kingdom

1. Sort out the animals on the basis of their symmetry (radial or bilateral) coelenterates, ctenophores, annelids, arthropoda & echinoderms.
2. There has been an increase in the number of chambers in heart during evolution of vertebrates. Give the names of the class of vertebrates having 2, 3 or 4 chambered heart.
3. Give the characteristic features of the following citing an example of each.
  - (a) Chondrichthyes & Ostichthyes
  - (b) Urochordata & Cephalochordata
  - (c) Acoelomate & Pseudocoelomate
  - (d) Polyp & Medusa
4. Mention two similarities between:
  - (a) Aves & Mammals
  - (b) A Turtle & Pila
  - (c) A frog & Crocodile
5. Name
  - (a) A libless animal
  - (b) A cold blooded animal
  - (c) An animal with Cnidoblast
  - (d) A warm blooded animal
  - (e) An animal having canal system & spicules
  - (f) An animal having dry & cornified skin
6. Endoparasite are found inside the host body. Mention the special structure, possessed by these & which enables them to survive in those conditions. **(HOTS)**
7. Differentiate between:-
  - (a) Open & closed circulatory system
  - (b) Oviparous & Viviparous animals
  - (c) Direct & Indirect development
8. Give three major differences between chordates and non- chordates. Draw a schematic sketch of a chordate showing those features.
9. Comment upon habitats & external features of animals belonging to class Amphibia, Reptilia & Mammalia.
10. What is the relation between germinal layers & the formation of body cavity in case of coelomates, acoelomates & pseudocoelomates.
11. Match the following list of anials with their level of organization.
 

Divison of Labour	Animal
Organ Level	<i>Pheritma</i>
Cellular aggregate level	<i>Fasciola</i>
Tissue Level	<i>Spongilla</i>
Organ System Level	<i>Obelia</i>
12. Mammals are most adapted vertebrates, elaborate.
13. Identify the phylum where adults exhibit radial symmetry & larva exhibits bilateral symmetry.
14. What is the importance if pneumatic bones & air sacs in Aves? **(HOTS)**
15. Which group of chordates posses sucking & circular mouth without jaws?

16. Name the animal, which exhibits the phenomenon of bioluminescence. Mention the phylum to which it belongs?
17. Give two modifications in reptiles required for terrestrial mode of life. **(HOTS)**
18. Mention one example each for animals with chitinous exoskeleton & those covered by a calcareous shell.
19. What is the role of radula in phylum mollusca?
20. Provide appropriate technical term in the space provided.
  - (a) Blood filled cavity in arthropods.....
  - (b) Free-floating forms of cnidaria.....
  - (c) Stinging organ of jelly fishes.....
  - (d) Lateral appendages in aquatic annelids.....
21. Fill up the blank spaces appropriately.

Phylum/Class	Excretory Organ	Circulatory Organ	Respiratory Organ
Arthropoda			Lungs/Gills Skin/Parapodia
	Nephridia Metanephridia	Closed Open	
Amphibia		Closed	
Aves		Closed	